

REMARKS

The final Office Action dated September 28, 2007, and the patents cited therein have been carefully reviewed, and in view of the following remarks reconsideration and allowance of all the claims pending in the application are respectfully requested.

Claims 1-20, 22-24 and 26 stand finally rejected. By this Response, no claims have been amended or canceled, and claims 1-20, 22-24 and 26 remain pending.

The Rejection Under 35 U.S.C. § 103(a) Over Yanai In View of Shomler

Claims 1-20, 22-24 and 26 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Yanai et al. (Yanai), U.S. Patent No. 6,502,205 B1, in view of Shomler, U.S. Patent No. 5,623,599.

Applicant respectfully traverses this rejection. Applicant respectfully submits that the subject matter according to any of claims 1-20, 22-24 and 26 is patentable over Yanai in view of Shomler. Applicant respectfully submits that even if the applied patents are properly combinable, the method and system resulting from the combination of Yanai and Shomler is not the claimed subject matter.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in Applicant's disclosure. See *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (See, also, MPEP §§ 706.02(j) and 2143).

Regarding claim 1 and the third basic criterion for establishing a *prima facie* case of obviousness, neither Yanai nor Shomler disclose or suggest a method comprising

asynchronously remotely copying each respective log record write from the primary site to the remote site; receiving an acknowledgement at the primary site, such that the acknowledgement corresponds to a log record write that has been completed at the remote site; and asynchronously remotely copying each data record write having a sequential identification that is prior to or equal to the sequential identification of the log record write corresponding to the received acknowledgement.

The Examiner persists in admitting that Yanai is silent regarding most of the subject matter of claim 1. In particular, the Examiner persists in admitting that “Yanai is silent with respect to asynchronously remotely copying each respective log record write from the primary site to the remote site; receiving an acknowledgement at the primary site, the acknowledgement corresponding to a log record write that has been completed at the remote site; and asynchronously remotely copying each data record write having a sequential identification that is prior to or equal to the sequential identification of the log record write corresponding to the received acknowledgement.” (See final Office Action dated September 28, 2007, page 4, lines 4-11.) Because Yanai is silent regarding these limitation of claim 1, it follows that Yanai cannot suggest these limitation. Consequently, if the combination of Yanai in view of Schomler is to provide this particular limitation of claim 1, then Schomler must disclose or suggest these limitations.

Regarding Schomler, Applicant respectfully submits that Schomler does not disclose or suggest a method comprising asynchronously remotely copying each respective log record write from the primary site to the remote site; receiving an acknowledgement at the primary site, such that the acknowledgement corresponds to a log record write that has been completed at the remote site; and asynchronously remotely copying each data record write having a sequential identification that is only prior to or equal to the sequential identification of the log record write corresponding to the received acknowledgement.

The Examiner asserts that column 4, lines 10-17 of Shomler discloses asynchronously remotely copying each respective log record write from the primary site to the remote site. (See final Office Action, page 3, lines 11-13.) In actuality, this portion of Shomler discloses that to

perform asynchronous copying, a sequence of data updates that is determinable at a local site must be communicated to a remote site and the remote site must be able to use the sequence to control updating at the remote site. Thus, contrary to the Examiner's assertion, this portion of Shomler does not disclose anything about a log record write that is copied from a primary site to a remote site. Further, this portion of Shomler does not suggest anything about a log record write that is copied from a primary site to a remote site.

Notably, the Examiner's assertion that column 4, lines 10-17 of Shomler discloses asynchronously remotely copying each respective log record write from the primary site to the remote site is curiously inconsistent with the Examiner's assertion at page 14, lines 3-5, of the final Office Action in which the Examiner states that "Shomler was not relied upon for the disclosure of the log record write containing information describing to [sic] modifications to the page of the database for a corresponding data record write." (Interestingly, the Examiner's admission at page 14, lines 3-5, is fully consistent with Applicant's assertion that column 4, lines 10-17, of Shomler does not disclose or suggest anything about a log record write that is copied from a primary site to a remote site.)

Accordingly, because Shomler does not disclose or suggest a log record write containing information describing modifications to the page of the database for a corresponding data record write, as admitted by the Examiner at page 14, lines 3-5, of the final Office Action, it logically follows that Shomler cannot disclose or suggest "receiving an acknowledgement at the primary site, the acknowledgement corresponding to a log record write that has been completed at the remote site."

Further still, in view of the Examiner's admission at page 14, lines 3-5, of the final Office Action, it logically follows that Shomler cannot disclose or suggest asynchronously remotely copying each data record write having a sequential identification that is only prior to or equal to the sequential identification of the log record write corresponding to the received acknowledgement.

Consequently, based on the Examiner's statements and admissions, neither Yanai nor Schomler disclose or suggest asynchronously remotely copying each respective log record write

from the primary site to the remote site; receiving an acknowledgement at the primary site, such that the acknowledgement corresponds to a log record write that has been completed at the remote site; and asynchronously remotely copying each data record write having a sequential identification that is prior to or equal to the sequential identification of the log record write corresponding to the received acknowledgement. The Examiner admits that Yanai is silent regarding with respect to these limitations. The Examiner also admits that Schomler has not been relied on for the concept of a log record write containing information describing modifications to the page of a database for a corresponding data record write.

Looking past the Examiner's notable statements and admissions for a moment and considering whether the Examiner's other assertions regarding Shomler have any merit, Applicant respectfully submits that column 9, lines 33-39, and column 10, lines 34-45, of Shomler, which are cited by the Examiner, relate to an improvement to an asynchronous copy operation system disclosed in U.S. Patent Application Serial No. 07/992,219 (now U.S. Patent No. 5,577,222 to Micka et al.). The Micka et al. system is disclosed by Shomler to use a sequence checkpoint for maintaining sequence integrity with asynchronous information packet presentation. According to Shomler, the Micka et al. system uses a set of information packets that are grouped together and processed as a single sequence unit. Shomler discloses that the Micka et al. sequence unit (i.e., the group of information packets) is interpreted and processed as though all or none of the writes in the group have occurred. (See Shomler, column 7, lines 22-38, and column 9, lines 33-39.) The checkpoint group of information packets is assigned a checkpoint sequence number and sent to a secondary process location where all the data updates represented in the checkpoint group are treated as a single unit for sequence integrity. (See Shomler, column 8, lines 1-3.) According to Shomler, changed data for all the information packets must be received before any data for an information packet in the group is written to a secondary DASD (Direct Access Storage Device) copy. (See Shomler, column 8, lines 1-9.) Thus, Shomler discloses that the Micka et al. system allows for a situation in which the information packets forming a group might not be complete and written as a secondary

DASD copy before a subsequently queued group of information packets is complete and written as a secondary DASD copy.

Applicant respectfully notes that the Micka et al. system, as disclosed, allows for a situation that is contrary to the subject matter of claim 1. That is, the Micka et al. system does not “asynchronously remotely copying each data record write having a sequential identification that is only prior to or equal to the sequential identification of the log record write corresponding to the claimed received acknowledgement” because according to Micka et al. the information packets forming a group might not be complete and written as a secondary DASD copy before a subsequently queued group of information packets is complete and written as a secondary DASD copy.

Shomler further discloses a situation in which there might be some transactions that are so important that the transactions must be communicated before the total number of transactions within a sequence checkpoint (i.e., a group) is complete. (See Shomler, column 8, lines 16-19.) Shomler demonstrates that for the Micka et al. system the overall flow of the (asynchronous) transactions would be disrupted for such a situation. (See Shomler, column 8, line 33, through column 9, line 5.)

Shomler purports to provide an improvement to the Micka et al. asynchronous copy operation system (and the disruptive situation in which some transactions are so important that the transactions must be communicated before the total number of transactions within a sequence checkpoint is complete that is contrary to the claimed subject matter) by providing a synchronizing marker system for communicating important transactions before the total number of transactions within a sequence checkpoint is communicated without disrupting the overall flow of the transactions in the system. (See Shomler, column 9, lines 6-8, and column 11, lines 27-30.) It is this improvement by Shomler to the Micka et al. system and an alternative embodiment of the Shomler system on which the Examiner relies as a basis for the rejection of claim 1 by citing column 9, lines 33-39, and column 10, lines 34-35 of Shomler.

Taking a closer look at the Shomler improvement on which the Examiner relies, Shomler discloses that an application process 12' in the Shomler system creates a marker request event 4a

upon the completion of a local write operation 4. The marker request event 4a is signaled to copy process 16'. It should be noted that marker request event 4a is disclosed by Shomler to be subsequent to: (a) application process 12' performing an I/O write to DASD subsystem 14' (indicated at 2 in Shomler Figure 5); (b) DASD subsystem 14' sending a message token to the copy process 16' in response to recognizing that a write to a storage area that is to be copied is about to be performed (indicated at 3 (and 5) in Shomler Figure 5; and (c) completion of the process application's I/O write operation (indicated at 4 in Shomler Figure 5). Copy process 16' arranges the message token received at 5 in the correct sequence relative to other copy events in the system. (See Shomler, column 9, lines 18-25.)

In response to marker request event 4a, copy process 16' creates a marker message token and inserts the marker message token into the message stream that is moved to secondary subsystem 18' (indicated at 6 in Shomler Figure 5). At secondary subsystem 18', the message marker token is recorded into the control info log and pending write queue in the same manner as other message tokens (indicated at 4b in Shomler Figure 5). (See Shomler, column 9, lines 26-32.) When the group (recall the Micka et al. sequence unit of grouped information packets) that encompasses the marker synchronize request is complete and ready to be written to the secondary DASD subsystem, the secondary remote copy data mover returns an acknowledgement to the primary subsystem that the marker operation is complete, that is, that the secondary subsystem has secured all the secondary write data that is preceded by the marker. (See Shomler, column 9, lines 33-39.) Regardless, the acknowledgement returned to the primary subsystem is not an acknowledgement that corresponds to a log record write that has been completed at the remote site. The acknowledgement disclosed by Shomler corresponds to a data record write. Thus, Shomler does not disclose or suggest receiving an acknowledgement at the primary site, such that the acknowledgement corresponds to a log record write that has been completed at the remote site as required by claim 1.

Figure 6 of Shomler shows an exemplary pending write queue at a secondary subsystem 18' depicting a synchronizing MARKER TOKEN 126 in a pending write queue. Notably, Figure 6 shows DATA BEING MARKED 122 inserted in the pending write queue prior to the

point in which synchronizing MARKER TOKEN 126 has been inserted into the queue. Shomler indicates that the marker synchronize request (i.e., MARKER TOKEN 126) causes no secondary DASD copy write. (See Shomler, column 9, line 67, through column 10, line 1.) In fact, a message MARKER TOKEN 126 that is inserted into the pending write queue has no corresponding update write data, and will necessarily have a later time stamp and higher global event sequence number than tokens for any preceding I/O write operation. (See Shomler, column 9, lines 51-58, emphasis added.)

Other notable items depicted in Figure 6 of Shomler include (a) a depiction of UPDATED DATA in the pending queue as shaded blocks, and (b) some later-in-time UPDATED DATA in the pending queue before some earlier-in-time UPDATED DATA. (See Shomler, column 10, lines 1-8.) Thus, no indication of UPDATED DATA by a shaded block indicates that no UPDATED DATA has yet been received and inserted into the pending queue. Recalling that the Micka et al. system contemplates a situation in which the information packets forming a group containing a marker token might not be complete before a subsequently queue group of information packets is complete, Figure 6 confirms that the Shomler system also contemplates such a similar situation. That is, Shomler contemplates a situation in which information packets forming a group and containing a marker token might not be complete and written as a secondary DASD copy before a subsequently queued group of information packets (group) is complete and written as a secondary DASD copy. As disclosed by Shomler, an incomplete group will accordingly not be processed until the group is complete even though the group might contain a marker token. (See Shomler, column 8, lines 1-9.)

Thus, it is plain that Shomler MARKER TOKEN 126 cannot be the claimed log record write of claim 1 because MARKER TOKEN 126 does not contain information describing to modifications to the page of the database for a corresponding data record write. (See Shomler, column 9, lines 51-58, and column 9, line 67, through column 10, line 1.) This aspect of the Shomler MARKER TOKEN is as expected because, as Applicant demonstrated above, Shomler does not disclose or suggest anything about a log record write that is copied from a primary site

to a remote site. Moreover, the Examiner admits as much at page 14, lines 3-5, of the final Office Action.

Further, the Examiner's characterization of the operation of Shomler is without basis because Shomler does not disclose or suggest asynchronously remotely copying each data record write having a sequential identification that is only prior to or equal to the sequential identification of the claimed log record write corresponding to the received acknowledgement. As demonstrated in connection with Figure 6, Shomler contemplates a situation in which information packets forming a group and containing a marker token might not be complete and written as a secondary DASD copy before a subsequently queued group of information packets is complete and written as a secondary DASD copy.

The Examiner responds to Applicant's argument that neither Yanai nor Shomler disclose a method comprising at least asynchronously remotely copying each data record write having a sequential identification that is only prior to or equal to the sequential identification of the log record write corresponding to the received acknowledgement by asserting that column 1, lines 14-19 and 50-59, of Schomler

details the purpose of the Shomler invention, which is to focus on the asynchronous remote data duplexing (i.e., copying). This is achieved through sequence integrity, which maintains the consistency of the arrangement of the write updates from one site to another site. Thereby, teaching the features of asynchronously remotely copying each data record write having a sequential id. (See final Office Action dated September 28, page 12, line 10, through page 13, line 1.)

Applicants respectfully submit that, contrary to this assertion by the Examiner, this portion of Schomler does not disclose that sequence integrity "maintains the consistency of the arrangement of the write updates from one site to another site" by "teaching the features of asynchronously remotely copying each data record write having a sequential id." In actuality, this cited portion of Schomler discloses the general concept of sequence integrity in an asynchronous copy system can be accomplished by communications between primary and

secondary DASD subsystems. In this regard, Schomler generally discloses that for an asynchronous copy system “a system at a primary site can determine the sequence among different update write operations among all DASD subsystems at the primary site and communicate that information to the DASD subsystem at the remote site.” (See Schomler, column 1, lines 50-56.) Schomler also generally discloses that the sequence information from the primary site is used by the secondary site “to control the application of update data to the secondary DASD data copy.” (See Schomler, column 1, lines 56-59.) Notably, this portion of Schomler does not disclose or suggest a “data record write having sequential id” as urged by the Examiner.

Immediately after Schomler’s general statement regarding concept of sequence integrity being accomplished by communications between primary and secondary systems (and notably immediately after the range of the Examiner’s cite), Schomler states that “[k]nown asynchronous copy systems are described below.” (See Schomler, column 1, lines 59-60.) Schomler proceeds to describe a number of known asynchronous copy systems that achieve sequence integrity by communications between primary and secondary systems. None of the known asynchronous copy systems described by Schomler specifically disclose a “data record write having sequential id.” This is notable for two reasons: (1) as already mentioned, none of the known asynchronous copy systems described by Schomler specifically disclose a “data record write having sequential id”; and (2) the Examiner appears to ignore this continued disclosure of Schomler by not specifically identifying which, if any, of the disclosed known asynchronous copy systems as disclosing a “data record write having sequential id.”

Thus, column 1, lines 14-19 and 50-59, of Schomler on which the Examiner relies for the conclusion of a “data record write having sequential id” discloses nothing and suggests nothing about a “data record write having sequential id.” Accordingly, Applicant respectfully submits that the Examiner’s conclusion in this regard is without basis.

The Examiner then argues that “[n]ext Schomler states” (See final Office Action dated September 28, 2007, page 13, line 1.) Applicants respectfully submit that the Examiner’s use of the word “next” effectively distorts the actual disclosure of Schomler. That is, based on

the way the Examiner uses the word “next,” one could easily conclude that immediately after Schomler’s general statements regarding achieving sequence integrity by communications between primary and secondary systems, Schomler discusses acknowledgement messages between secondary and primary systems. In actuality, this particular portion of Schomler that is relied on by the Examiner is some nine columns later and specifically relates to an alternative embodiment of Shomler that uses a data mover at the primary site and the secondary site that operates in a single system. Applicant has already addressed above the relevancy of this portion of Schomler with respect to the claimed subject matter.

In response to Applicant’s demonstration that the Shomler MARKER TOKEN 126 is not the claimed log record write, the Examiner cites *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981) and *In re Merck & Co., Inc.* 800 F.2d 1091, 231 USPQ 375 (Fed.Cir. 1986) for the proposition of law that one cannot show nonobviousness by attacking references individually where the rejections are based on combination of references. In this regard, the Examiner asserts that

Shomler was not relied upon for the disclosure of the log record write containing information describing to [sic] modifications to the page of the database for a corresponding data record write. In contrast, Yanai was relied upon for the disclosure of such limitation and is cited in the action above. As such, it is the combination of the two (2) references, which make up the invention as a whole. (See final Office Action, page 14, lines 3-7.)

Applicant respectfully submits that in view of the proposition of law asserted by the Examiner, Applicant queries that if (1) the Examiner admits that Yanai is silent with respect to a “whole bunch of limitations of the claimed subject matter,” (2) has not demonstrated that Shomler discloses the same “whole bunch of limitations of the claimed subject matter,” and (3) actually admits that Shomler does not disclose or suggest the same “whole bunch of limitations of the claimed subject matter,” then how does the combination of these two references make up the claimed subject matter as a whole? Further, Applicant respectfully submits that Yanai and

Shomler do not need to be attacked individually because the Examiner has not established the third basic criterion for establishing a *prima facie* case of obviousness.

Thus, Applicant respectfully submits that claim 1 is allowable over Yanai in view of Shomler. It follows that claims 2-6, which incorporate the limitations of claim 1, are each allowable over Yanai in view of Shomler for at least the same reasons that claim 1 is considered allowable.

Regarding claim 7, Applicant respectfully submits that the subject matter of claim 7 is allowable over Yanai in view of Shomler for reasons that are similar to the reasons that claim 1 is considered allowable over Yanai in view of Shomler. It follows that claims 8 and 9, which incorporate the limitations of claim 7, are each allowable over Yanai in view of Shomler for at least the same reasons that claim 7 is considered allowable.

Regarding claim 10, Applicant respectfully submits that the subject matter of claim 10 is allowable over Yanai in view of Shomler for reasons that are similar to the reasons that claim 1 is considered allowable over Yanai in view of Shomler. It follows that claims 11-14, which incorporate the limitations of claim 10, are each allowable over Yanai in view of Shomler for at least the same reasons that claim 10 is considered allowable.

Regarding claim 15, Applicant respectfully submits that the subject matter of claim 15 is allowable over Yanai in view of Shomler for reasons that are similar to the reasons that claim 1 is considered allowable over Yanai in view of Shomler. It follows that claims 16-19, which incorporate the limitations of claim 15, are each allowable over Yanai in view of Shomler for at least the same reasons that claim 15 is considered allowable.

Regarding claim 20, Applicant respectfully submits that the subject matter of claim 20 is allowable over Yanai in view of Shomler for reasons that are similar to the reasons that claim 1 is considered allowable over Yanai in view of Shomler. It follows that claims 22-24 and 26, which incorporate the limitations of claim 20, are each allowable over Yanai in view of Shomler for at least the same reasons that claim 20 is considered allowable.

Thus, Applicant respectfully submits that it is only by impermissible hindsight that the Examiner is able to reject claims 1-20, 22-24 and 26 based on the Yanai in view of Shomler.

The method and the system resulting from the combination of Yanai in view of Shomler are simply not the claimed subject matter. In particular, the Examiner cannot have it both ways. That is, the Examiner cannot on one hand assert that Shomler discloses a log record write, and then later deny it. Accordingly, it is only by using Applicant's disclosure as a template that the Examiner is able to select particular features of Yanai in view Shomler through a hindsight reconstruction of Applicant's claims to make the rejection.

Consequently, Applicant respectfully requests that the Examiner withdraw this rejection and allow claims 1-20, 22-24 and 26.

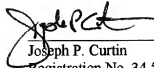
CONCLUSION

In view of the above amendments and arguments which present the claims in better form for consideration on appeal, it is urged that the present application is now in condition for allowance. Should the Examiner find that a telephonic or personal interview would expedite passage to issue of the present application, the Examiner is encouraged to contact the undersigned attorney at the telephone number indicated below.

It is requested that this application be passed to issue with claims 1-20, 22-24 and 26.

Respectfully submitted,

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